Amendments to the Specification:

Please replace the paragraph starting with "An optical signal" beginning on page 7, lines 23-24, ending on page 8, lines 1-9 with the following amended paragraph:

An optical signal transmitter 100 inputs a transmission electrical data signal 105, organizes it into frames to form a transmission signal, performs electrical-to-optical signal conversion, and transmits the resulting optical signal. An optical coupler 110 receives this optical signal as its input and splits it into two signals (in a 50:50 split, for example) to output to a first transmission line 120 and a second transmission line 130. Optical couplers 140 and 150 each extract a sample (e.g. 5%) of the respective signals received via the first and second transmission lines 120 and 130, and supply the sample to optical ~~sensors~~ detectors including first optical detection unit 210 and second optical detection unit 220. The optical sensors 210 and 220 monitor the optical signal strength of the signals through the first and second transmission lines 120 and 130 and output information on the monitored optical signal strength as optical signal strength monitor data 215 and 225.

Please replace the paragraph starting with "Fig. 5 shows" beginning on page 9, lines 16-24, ending on page 10, lines 1-2 with the following amended paragraph:

Fig. 5 shows a pre-switching check monitoring sequence for switching between the working and protection circuits. In Fig. ~~2~~5, the management system 250, the controller 230, the memory 240, the optical switch driver 165, the optical switch 160, the reception signal performance monitor 190, the first transmission line optical ~~sensor~~ detector or the first optical detection unit 210, and the second transmission line optical ~~sensor~~ detector 220 or the second optical detection unit of Fig ~~2~~5 are all components of the basic configuration as shown in Fig. ~~1~~4. In this check monitoring sequence, before switching over to the protection circuit in response to a circuit trouble or performing routine maintenance, a check request command is issued. This command results in the protection circuit being monitored for a given period of time prior to switching so as to improve the maintenance performance of the system.

Please replace the paragraph starting with "The operations" beginning on page 12, lines 17-24, ending on page 13, lines 1-7 with the following amended paragraph:

The operations will be described for the case wherein a fault has occurred in the first transmission line 120. When the fault occurs in the first transmission line 120, the abnormal state is detected by the first transmission line optical sensor 210. The first transmission line 120 is currently selected by the optical switch 160, and the receive signal performance monitor 190 monitors the performance of the first transmission line 120. The receive signal performance monitor 190 and the first transmission line optical ~~sensor~~ detector or first optical detection unit 210 respectively send fault alarms 410 and 420 to the controller 230. When it receives the fault alarms 410 and 420, the controller 230 sends a switch request 430 to the switch driver 165. When the optical switch driver 165 receives the switch request 430, it sends a drive signal 440 to the optical switch 160. Based on the drive signal 440, the optical switch 160 switches from the first transmission line 120 to the second transmission line 130, and data transmission is maintained with the second transmission line 130 as the working circuit. As a result, the receive signal performance monitor 190 is switched from the first transmission line 120 to monitor the performance of the second transmission line 130.

Please replace the paragraph starting with "The controller 230" beginning on page 14, lines 12-20 with the following amended paragraph:

The controller 230 performs a sensing result save operation 360 in the memory 240 based on information from the receive signal performance monitor 190, the first transmission line optical ~~sensor~~ detector or first optical detection unit 210, and the second transmission line optical ~~sensor~~ detector or second optical detection unit 220. In addition, the management system 250 sends a confirmation request 370 to the controller 230. Upon receiving the confirmation request 370, the controller 230 sends a read request 380 to the memory 240. The controller 230 performs a read operation 390 to read the sensing results from the memory 240, and sends a results report 400 to the management system 250. The management system 250 saves the results report 400 in an appropriate memory device.

Please replace the paragraph starting with "An exemplary" beginning on page 15, lines 12-17 with the following amended paragraph:

An exemplary automatic check operation is performed when both the first and second transmission lines 120 and 130 are operating normally. The first and second transmission line optical ~~sensors~~ detectors or including first optical detection unit 210 and second optical detection unit 220 detect that both transmission lines are operating normally. The first transmission line 120 is currently selected by the optical switch 160, and the receive signal performance monitor 190 monitors the performance of the electrical receive signal 195 from the first transmission line 120.

Please replace the paragraph starting with "A package 5001" beginning on page 17, lines 10-14 with the following amended paragraph:

A package 5001 comprises optical couplers 520 and 525, optical ~~sensors~~ detectors including first detection unit 530 and second optical detection unit 535, optical switches 540, 545, and 550, a first transmission line monitor port 560, a second transmission line monitor port 570, and a working circuit port 565. The package 5001 is alternatively configured without certain of these constituent elements within the scope of the invention.

Please replace the paragraph starting with "A package 5002" beginning on page 18, lines 18-22 with the following amended paragraph:

A package 5002 comprises optical couplers 520 and 525, optical ~~sensors~~ detectors including first optical detection unit 530 and second optical detection unit 535, optical switches 540 and 550, a first transmission line monitor port 560, and a working circuit port 565. The package 5002 are alternatively configured without certain of these constituent elements within the scope of the invention. Other configurations are the same as in the above first exemplary monitor port configuration.

Please replace the paragraph starting with "A package 5003" beginning on page 19, lines 9-13 with the following amended paragraph:

A package 5003 comprises optical couplers 520 and 525, optical ~~sensors~~ detectors including first optical detection unit 530 and second optical detection unit 535, an optical switch 610, a working circuit port 620, and a protection circuit monitor port 630. The package 5003 are alternatively configured without certain of these constituent elements within the scope of the invention. Other configurations are the same as in the above first exemplary monitor port configuration.

Please replace the paragraph starting with "An optical coupler" beginning on page 22, lines 22-24 and ending on page 23, lines 1-19 with the following amended paragraph:

An optical coupler 110 splits its optical signal 1100 input into two output signals (in a 50:50 split, for example) to a first transmission line input unit 1120 and a second transmission line input unit 1130. In the first and second transmission line input devices 1120 and 1130, optical signal receivers 1122 and 1132 receive the two input signals monitor-and-process units 1124 and 1134 monitor performance of the optical signals and convert formats. Optical signal transmitters 1126 and 1136 perform wavelength conversion and output the resulting signals to the first and second transmission lines 120 and 130. In the first and second transmission line output units 1140 and 1150, optical signal receivers 1142 and 1152 receive the optical signals transmitted over the first and second transmission lines 120 and 130. ~~Monitor-and-process~~Optical Line Performance Monitor units 1144 and 1154 monitor performance or quality in the optical signals and conversion of formats. Optical transmitters 1146 and 1156 perform E/O conversion and output optical signals. ~~Monitor-and-process~~Optical Line Performance Monitor units 1144 and 1154 monitor the performance in the received signals, and output the results of the monitoring as 'signal performance monitor data' 1160 and 1170 for example. Signal performance monitor data 1160 and 1170 is the same monitor data as the signal performance monitor data 205 of Fig. 1. The optical couplers 1200 and 1210 respectively extract small samples such as 5% of the output signals from the first and second

transmission line output units 1140 and 1150. Optical ~~sensors~~ detectors including first optical detection unit 1220 and second optical detection unit 1230 monitor the signal strength of the optical signals that have been outputted by the first and second transmission line output units 1140 and 1150. The optical sensors 1220 and 1230 output their sensing results as 'optical signal strength monitor data' 1240 and 1250.

Please replace the paragraph starting with "Fig. 15 " beginning on page 24, lines 16-24 and ending on page 25, lines 1-17 with the following amended paragraph:

Fig. 15 is a block diagram illustrating a basic 1 + 1 optical switching configuration in which switching is performed by blocking the optical output signal of a transmission line output unit. The configuration of Fig. 15 does not use the signal performance monitor data 1160 and 1170 of Fig. 14, in which the performance monitoring results are sent. Therefore, blocking devices 1148 and 1158 are located in the first and second transmission line output units 1140 and 1150 to block the optical output signals. Reception signal performance monitoring is performed for quality in ~~monitor and process~~optical line performance monitor units 1144 and 1154, and the performance monitoring results are sent to blocking devices 1148 and 1158. As for the method of transmitting these results, any appropriate method includes separate lines in the transmission line output units 1140 and 1150 and empty areas of the signal frame. Based on the transmitted monitor results, the blocking devices 1148 and 1158 block the optical output of the first transmission line 120 or second transmission line 130 when the performance of either line is degraded. Optical couplers 1200 and 1210 extract small samples such as 5% of the optical signals from the first and second transmission line output units 1140 and 1150. Optical sensors 1220 and 1230 monitor the optical signal strength of output optical signals from the first and second transmission line output units 1140 and 1150 and output 'optical signal strength monitor data' 1240 and 1250, which contain information on the monitored optical signal strength. When a transmission line is determined to be faulty as a result of performance or quality monitoring by ~~monitor and process~~optical line performance monitor units 1144 and 1154 as described above, the

signal of that transmission line will be blocked by one of the blocking devices 1148 and 1158. This will result in either of the lines to be faulty or low optical signal strength based upon by the corresponding optical ~~sensor~~ detector or first optical detection unit 1220 or second optical detection unit 1230. A controller 230 is generally located within the apparatus and performs system monitor and control functions based on optical signal strength monitor data 1240 and 1250. Other than the above, this configuration is the same as that of Fig. 14.

Please replace the paragraph starting with "An optical coupler " beginning on page 26, lines 4-22 with the following amended paragraph:

An optical coupler 110 splits its optical signal 1100 input into two signals in such a manner as a 50:50 split to a first transmission line input unit 1120 and a second transmission line input unit 1130. In the first and second transmission line input units 1120 and 1130, optical signal receivers 1122 and 1132 receive the two input signals; optical line performance monitor ~~monitor-and-process~~ units 1124 and 1134 monitor performance of the optical signals and convert formats. Optical signal transmitters 1126 and 1136 perform wavelength conversion, and output the resulting signals to the first and second transmission lines 120 and 130. In the first and second transmission line output units 1140 and 1150, optical signal receivers 1142 and 1152 receive the optical signals transmitted over the first and second transmission lines 120 and 130; ~~monitor-and-process~~optical line performance monitor units 1144 and 1154 monitor performance of the optical signals and convert formats. Optical transmitters 1146 and 1156 perform signal wavelength conversion and output the optical signals. Monitor-and-process units 1144 and 1154 monitor performance of the received signals, and output the results as 'signal performance monitor data' 1160 and 1170. For example, signal performance monitor data 1160 and 1170 are the same as the signal performance monitor data 205 of Fig. 1. The optical combiner 1260 combines the optical signals output from the first and second transmission line output units 1140 and 1150 and outputs the optical reception signal 1110. For example, the combiner is made using an optical coupler.